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Studies on Tuberculin Sensitivity in the Bovine*

by

W. R. KERR, H. G. LAMONT AND J. L. McGIRR

Introduction

Robert Louis Stevenson (1850-94) once stated that "it is not a hard thing to know what to write : the hard thing is to know what to leave out." This remark might be applied specifically to tuberculosis the literature of which is so vast, complex and, in some instances, contradictory, that even when dealing with one restricted, albeit important, aspect of the tuberculosis problem, it is no easy task to acquire a sufficiently complete appreciation of the results and fallacies of the information available to allow of the initiation of a reasoned and rational approach to further investigational work. In no disease are the inter-relationships between causative organism and host of more decisive significance than they are in tuberculosis : yet mainly because of the fact that "the significant biological reactions occur in an almost inaccessible bacillus and, to a great extent, in almost inaccessible host cells" (Corper, 1943), no accurate scientific method for the evaluation of these interacting factors is available.

In Great Britain the current schemes for the control and eradication of bovine tuberculosis are largely based on the tuberculin test—*i.e.*, on the detection of animals rendered hypersensitive to tuberculo-protein as the result of infection. That precise and comprehensive information regarding the relationship existing between infection, immunity and the development (and nature) of specific hypersensitivity is necessary for the accurate interpretation of any such test and for the understanding of its inherent fallacies is very obvious but, despite much research and many publications and critical reviews, opinion is still divided on this important and complex problem.

In the 'nineties KOCH viewed specific immunity and the tuberculin reaction as a unity and the work of ROEMER (1904-12) and KRAUSE (1920-26) led to the conclusion that the specific immune and the specific allergic conditions were identical. Many modern investigators still follow this reasoning (*e.g.* URBACH & GOTTLIEB 1941). On the other hand, recent work (*e.g.*, CORPER *et al.* 1940, BIRKHAUG 1941, OPIE 1936, LURIE 1936, 1939) suggests that specific immunity and specific bacterial hypersensitivity are unrelated biological phenomena which exist separately, although they usually develop co-incidently and appear to occur inseparably because they arise under the stimulus of the same complex antigen—the tubercle bacillus. Likewise, tuberculo-anaphylaxis appears to be a phenomenon separate from tuberculo-allergy and to be without special significance in the various reactions of tuberculosis (CORPER & COHN, 1940). HADFIELD & GARROD (1943) and SHERWOOD (1941) subject all the available information to critical review and conclude that the evidence favours the view that bacterial hypersensitivity and immunity are unrelated and separate phenomena. WILSON *et al.* (1940) continue to hold the opposite view : they contend that, in the desensitization experiments on which much of the evidence for the above conclusions depends, tuberculin treatment may be regarded as a cloak which merely serves to obscure the more blatant manifestations of the allergic state, but leaves unaffected the inherent ability of the tissues to respond abnormally. This argument is of importance in that it introduces the opportunity of stressing the need for precise and accurate terminology : unfortunately, the term desensitization tends to be used rather loosely and in different senses by different authors. This matter is subjected to detailed discussion later in this paper (Part II).

The problem of whether or not the true (or "delayed") tuberculin reaction is mediated by an antigen-antibody mechanism is also a "bone of contention" though RICH (1944), after an exhaustive review of the information available, concludes—"there are, however, persuasive reasons for believing that the late tuberculin reaction is determined by specific antibody—elusive as that antibody may be."

In the half century that has passed since the introduction of tuberculin and tuberculin testing many attempts have been made to improve the efficacy and accuracy of testing methods. v BEHRING (1899) appears to have been the first person to demonstrate that the skin of the tuberculous bovine is responsive to tuberculin and, since that time, various methods of cutaneous testing have been employed. MOUSSU & MANTOUX (1908) demonstrated the value of the intradermal test and described the type of response which might be expected in tuberculous and non-tuberculous animals and the M.R.C. Tuberculin Committee of 1925 introduced the double intradermal method of testing. However, despite claims for increased sensitivity the efficacy of the latter method does not appear to be any greater than that of the single intradermal test.

That KOCH'S Old Tuberculin (O.T.) is a remarkably efficient agent for the diagnosis of bovine tuberculosis is unquestionable : that at the same time, it possesses several serious drawbacks is equally well established. These faults are particularly evident with the intracutaneous method of testing since the heterogeneous complex of substances which constitutes O.T. (the residuum of the peptone-broth of the growth-medium plus all the metabolic and autolytic products of the organism which are not precipitated by the 50 per cent. glycerol concentration attained during the evaporation) elicits diffuse reactions in normal animals, thus rendering the interpretation of the test somewhat difficult. These "non-specific" reactions became really troublesome when it was realized that a very considerable number of animals in this country possessed in large or small measure a degree of skin sensitivity resulting from sensitization with other acid-fast organisms, *e.g.*, avian type.

The problem of reactions in normal animals was largely overcome by abandoning O.T. in favour of heat-concentrated synthetic-medium (H.C.S.M.) tuberculin, and the question of non-specific sensitization of avian type was tackled by introducing the "comparative test," *i.e.*, the simultaneous testing of each animal with mammalian and avian tuberculins. The H.C.S.M. tuberculins, however, still have important faults, the most serious (from the viewpoint of comparative testing) being the considerable variations which occur in the tuberculo-protein (active principle) content of different herds.

These variations due to fluctuations in the tuberculo-protein content of different batches of culture-media were completely eliminated by the introduction of purified protein derivative (P.P.D.) tuberculins in which the protein content could be accurately standardized. Even with these tuberculins, however, the specificity problem is still of importance. The variability in the degree of sensitivity exhibited by infected cattle in the field, and the consequent dosage of P.P.D. required to ensure the detection of minimal sensitivity produces a situation in which a proportion of cases do not yield clear-cut results. The implication of such findings would seem to be that, so far as the bovine subject is concerned, the "natural" specificity differences of mammalian, avian, and johne P.P.D. tuberculins are not sufficiently wide to ensure the production of specific, or even of relatively specific, reactions with the present testing methods.

It thus appears that the major requirements for the development of an accurate system of tuberculin testing are three-fold : (1) precise information regarding the relationship between infection and the development of specific hypersensitivity and knowledge of the factors which may modify this relationship ; (2) use of specific and standardized tuberculins ; and (3) development of an accurate system of testing. The studies outlined in this paper are concerned with the first and third of these requirements.

A primary difficulty, and one of considerable importance, in any approach to the problem of the antibody response to tuberculosis is that no satisfactory blood test is available to relate the presence and progress of the disease to the character of the intradermal tuberculin test. For this reason, the experimental work was initiated on the basis of certain experiences and findings accruing from work on *Tr. foetus*, where such a blood test was available : *e.g.*, the study of the antibody response to *Tr. foetus* in the bovine (KERR & ROBERTSON, 1943), the passive transference of *Tr. foetus* antibodies from the maternal colostrum to the new-born calf and the effect of parturition on tricin skin sensitivity (KERR & ROBERTSON, 1946), and the intradermal test in trichomoniasis (KERR, 1944).

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PART I

The Effect of Parturition on the Tuberculin Tests and the Passive Transference of Skin Sensitivity to Calves via Colostrum

Despite its considerable practical and theoretical importance, published information regarding the effect of parturition on the reliability of the tuberculin test and on the passage of skin sensitivity to calves *via* colostrum is apparently scanty and, apart from the following studies in rabbits, human beings, and guinea-pigs, the writers have found little literature on the subject.

Wade (1942), in a study of the effect of pregnancy in experimental tuberculosis in rabbits, found that cutaneous tuberculin sensitivity was unaffected by pregnancy, but noted that it showed a transient decrease following parturition. Lichtenstein (1942), in a similar study in 82 pregnant tuberculous women, recorded that a marked depression of sensitivity occurred in the later months of pregnancy and that sensitivity tended to return to normal shortly after delivery. As for the passage of skin sensitivity from mother to offspring, Corper and Clark (1942), found that the anaphylactic hypersensitive state induced in female guinea-pigs by the intravenous injection of unheated human tuberculo-protein was transferred to offspring for over a year after sensitization of the mother but, while the paper is headed "Congenital Tuberculin Hypersensitiveness—", no mention is made as to whether the transference was *in utero* or *via* the colostrum. In any case, they were unable to transfer to the young the maternal skin-hypersensitive state induced by infection. This result was confirmed in a subsequent paper (Corper & Cohn, 1943). In an earlier study—and one whose findings are supported by many other workers—Corper *et al.* (1940) failed to find any evidence of the transference of true tuberculin skin hypersensitivity or immunity *via* the blood serum.

It should be noted that there is a greater likelihood of *in utero* passage of antibodies in animals whose placentation is of the haemo-chorial type—*e.g.*, human beings, guinea-pigs, and rabbits—than in animals whose placentation is epithelio-chorial—*e.g.*, cow, horse and pig. Kerr & Robertson's work on *Tr. foetus* (1946) indicates that at least one type of "skin-sensitizing" substance can be transferred *via* colostrum and, in view of the nature of placentation in the bovine, it seemed reasonable to assume that, if there was any transference of "skin-sensitizing" substance from the tuberculous bovine to her calf, it, too, must be *via* the colostrum.

With the aforementioned information available as a justification for initiating their investigation, the writer proceeded to a preliminary study of the effect of parturition on maternal tuberculin sensitivity, the antibody content of the colostrum, and the passage of these antibodies to the calf *via* the colostrum.

EXPERIMENTAL PROCEDURE

1. The Tuberculin Test

All testing was by the single intradermal method using Weybridge mammalian and avian tuberculins. Injections were located in the neck site parallel to the line of the shoulder with avian tuberculin about six inches above mammalian.

2. The Precipitin Test

This test was carried out on colostral whey using a methyl alcohol extracted antigen.

The whey was prepared by adding 2 ml. commercial essence of rennet to 100 ml. colostrum. The mixture was incubated for five minutes at 56° C. and then placed in the refrigerator for two hours. Thereafter the supernatant fluid was removed by decantation and clarified by centrifugation followed by Seitz filtration.

Antigens were prepared from Weybridge human strains PN, DT, and C, and from avian strain D.4. The organisms were grown for eight weeks on B.A.I. synthetic medium and then killed by steaming for three hours. The growth medium was removed by filtration and thorough washing with distilled water. Acetone was added to the wet debris and after one week the solvent was filtered off and the residue of the organisms incubator dried (37° C.). Acetone was added to the dried organisms—1 ml./10 mg. bacilli—and left in contact with them at room temperature for two days. The solvent was again removed and the bacterial residue incubator dried. The bacillary debris was next extracted with methyl alcohol for 14 days at 37° C.—1 ml. solvent/10 mg. debris. This extract, clarified by filtration and centrifugation, represents the stock antigen. The total nitrogen content of both human and avian antigens was in the region of 1·75 mg./100 ml. while the total carbohydrate was between 35 and 40 mg./100 ml. (using the Dische (1930) carbazole method). The stock antigen was diluted 1·10 with normal saline before use.

The following method for the *in vitro* precipitation tests was found to give optimal results: colostral whey dilutions of ½, ¼, ⅛—in ½ ml. quantities added to ½ ml. amounts of diluted antigen, and incubation for one hour at 37° C. followed by overnight standing at room temperature before reading.

3. Experimental Animals

A proportion of the animals formed part of the laboratory stock at Stormont, while others were derived from various herds undergoing test. We are indebted to Mr. J. Ogg, M.R.C.V.S., for supplying us with the test figures in the case of the latter group of animals.

The animals were all subjected to test one to eight weeks before parturition, one to fourteen days after parturition, and again four to six weeks later. Colostrum drawn immediately after parturition was subjected to the precipitin test in every case and in a proportion of them samples were tested at daily intervals thereafter. Calves, all of which received colostrum, were tested at varying intervals after birth.

A few experiments were carried out in an attempt to transfer skin sensitivity *via* blood serum.

RESULTS

Details of the results are not given owing to the bulky nature of the data and the following paragraphs merely give a summarized version of the salient features of the findings.

Of the 28 in-calf cows involved in the experiment, the ante-parturition intradermal test figures indicated that 20 were positive mammalian reactors, five were non-reactors and three were non-specific reactors. All of these animals were again subjected to the intradermal test 1 to 14 days after calving; the results were as follows: the five non-reactors remained as before, as did the three non-specific reactors, but of the 20 ante-parturition positive animals, seven did not react at all, five others would have been regarded as non-specific on the comparative test interpretation, and the remaining eight (while still positive) showed a marked drop in skin sensitivity. Subsequent tests at varying intervals indicated that skin sensitivity returned to its pre-parturition level some six weeks after calving. It may be noted at this stage that the post-parturient depression of skin-sensitivity recorded above does not affect the reliability of the Stormont test. (See Part III.)

Preliminary investigations regarding the presence of specific precipitin antibodies in colostrum indicated that neither human, bovine, nor avian P.P.D. tuberculins, nor a polysaccharide prepared from human tubercle bacilli reacted in a specific manner with colostral whey derived from infected cows. On the other hand, methyl alcohol antigen prepared from either human or avian organisms appeared to give specific precipitin reactions with colostral whey derived from mammalian infected animals, though neither avian nor human antigen reacted with colostrum from avian (or non-specific) sensitized cows. With one exception, the colostrum of all the positive mammalian reactors gave positive precipitin tests: the average titre of the first colostrum was 1:92 with a range of from 1:32 to 1:256. In view of the method of preparation of the colostral whey, which probably leaves large amounts of antibody in the residue after removing the whey, it must be assumed that the colostrum concentration of antibody is large. The antibody concentration of the colostrum appears to drop quickly, *e.g.*, average figures for ½ hour, 24 hours, 48 hours, 72 hours, 96 hours and 120 hours after calving are as follows: 1/92, 1/47, 1/36, 1/28, 1/3, 0.

The skin sensitivity of the reactor which failed to give a positive colostrum was not marked: nevertheless, this animal did show a post-parturient drop in skin sensitivity. It is hoped that this animal will be available for further examination. Another reactor of interest was one in which no colostrum was drawn, due to the presence of mastitis in all four quarters: this animal, a good positive prior to calving, nevertheless did not react after calving. It would thus appear that the post-parturient depression of skin sensitivity occurs whether or not the antibody containing colostrum is withdrawn.

It is interesting to note that the avian tuberculin reactions of the three ante-parturition non-specific reactors were scarcely affected by parturition and that these animals produced colostrum which did not react with precipitin antigen prepared from either mammalian or avian organisms.

The calf tuberculin tests indicated that a proportion of the offspring of reactor mothers may acquire a passive skin sensitivity to tuberculin. Of the 13 offspring of reactor mothers which were tested three showed evidence of sensitization, while two more might have been regarded as doubtful. This passive sensitivity appeared to persist for four to six weeks and there were indications that skin sensitization did not occur until seven days after the ingestion of the antibody containing colostrum.

The results of attempts to transfer skin sensitivity passively by means of blood serum were disappointing. The sera of the tuberculin positive animals used in the experiments, though tested on numerous occasions, never gave positive tests with methyl alcohol antigen which demonstrated the colostral antibody content. It may be that the serum antibody concentration is below the detectable level whereas the colostral antibody concentration is high, but it

is also possible that in the case of serum there is some interference in the production of precipitation.

DISCUSSION

In their trichomonas experiments Kerr & Robertson (1946) found (*a*) that the colostrum of sensitized cows possesses a considerable antibody content, (*b*) that such antibody is absorbed *via* the alimentary canal when fed to new-born calves, (*c*) that colostral fed calves of this type develop a tricin skin-sensitivity which persists for at least two months, (*d*) that the serum (as well as the colostrum) of infected cows can produce skin-sensitivity when injected into normal animals, (*e*) that the absorption of antibody from the alimentary canal of the calf is only possible in the first few hours of life—it is rapid and complete immediately after birth and partial between 12 and 24 hours, (*f*) that *in utero* transference of antibody does not apparently occur, and (*g*) that the tricin skin sensitivity of infected cows shows a more or less complete, though usually transient, depression immediately following calving.

The similarities and differences in the tuberculosis experiments recorded above are as follows :—

(*a*) the colostrum of mammalian sensitized animals appears to possess a quantity of specific antibody substance ;

(*b*) this antibody may be absorbed by the new-born calf ;

(*c*) these calves sometimes develop a transient skin-sensitivity to tuberculin which may persist for four to six weeks ;

(*d*) serum transference of skin-sensitivity to normal animals is considerably more difficult than in the case of trichomoniasis and further investigations are necessary to elucidate the position, and

(*e*) the skin sensitivity of mammalian-infected animals shows a marked post-parturient depression which may affect the reliability of the present tuberculin test for as long as four to six weeks.

Two of the non-specific reactors were also reactors to tricin and it is interesting to note that, though these animals lost little of their tuberculin skin reactivity at calving and gave no evidence of the presence of specific tuberculous antibodies in their colostrum, maternal tricin skin-sensitivity was completely suppressed after calving and colostrum skin sensitizing antibodies for trichomonas antigen were transferred to their calves. The precise significance of these results must await further experimentation, but they certainly seem to indicate that the processes involved in sensitization of the specific mammalian and non-specific types are not identical.

In those calves which show passive sensitization the skin reactivity appears to persist for six to eight weeks and the test results indicate that the "late" reaction seems to fade much more rapidly than the "early."

The relationship between maternal reactivity, colostrum titre, and calf sensitization, and between quantity of colostrum ingested and calf sensitization produced has not yet been sufficiently thoroughly investigated. It is, however, interesting to speculate on the possible relationship between the colostral loss of antibodies at calving and the well-known fact that parturition is liable to be followed by complete "breakdown" in actively infected tuberculous cows.

Experiments designed to explain the phenomenon of the parturition loss of skin sensitivity are now in progress. At the moment, the simplest explanation appears to be that which postulates that the formation of colostrum with its considerable antibody content creates a state in which fixed cell antibodies are abstracted into the general circulation and then drained into the colostrum. Many difficulties, of course, arise in accepting such a theory, but more precise information must await the results of further investigations.

PART II

Desensitization

In their studies on trichomoniasis Kerr & Robertson (1946) found that the injection of protein-containing extracts of trichomonads into tricin-positive animals resulted in the production of skin-desensitization. In view of these findings and because of the fact that specific desensitization is regarded as evidence of the antigen-antibody nature of any immune reaction, an investigation into the possibility of producing a comparable desensitization of tuberculin-sensitive animals was initiated.

Ever since the days of Koch it has, of course, been known that tuberculin-desensitation of infected animals is possible and, as all who were concerned with the old subcutaneous method of testing cattle for tuberculosis know well, "tuberculin doping" (*i.e.*, desensitization) of cattle to prevent reactions to the subcutaneous test is by no means difficult. Though little or no concrete evidence is available to support the idea, the opinion that the intradermal test is much less easily upset than the subcutaneous appears to be fairly widespread: and this despite the fact that much information is available on the desensitization of tuberculous human subjects and of laboratory animals.

Branch & Kropp (1937), Willis & Woodruff (1937), Birkhaug (1937), Wilson, Schwabacher & Maier (1940), Corper & Cohn (1943), Corper (1943), and many others carried out experiments showing that tuberculin desensitization of infected laboratory animals was easily produced. Greever (1942) answered the contention of Wilson *et al.* (1940) that "it is dangerous to conclude that the absence of a cutaneous reaction (produced by tuberculin desensitization) is proof of the concurrent absence of a systemic reaction" by showing that, in guinea-pigs, the abolition of skin-sensitivity is associated with the abolition of a thermal reaction. In man, desensitization by the repeated injection of increasing doses of tuberculo-protein has often been carried out, *e.g.*, Bauer (1909) succeeded in desensitizing tuberculous patients so that they could tolerate doses of up to 10 ml. of undiluted tuberculin. The phenomenon of desensitization is also of interest in that cross desensitization may help in the elucidation of the non-specific problem. It has been shown that related protein may be distinguished by this type of approach (*e.g.*, Dakin & Dale, 1919 ; Wells & Osborne, 1913) and the possibility exists that avian P.P.D. desensitization of the doubtful reactor which shows large reactions to both avian and mammalian tuberculins may prove useful.

EXPERIMENTAL

A proportion of the animals tested formed part of the laboratory stock at Stormont and the others were selected animals passing through Belfast Abattoir. The technique of the Stormont test is described in Part III of this paper.

RESULTS

The test results are not given in detail ; the following paragraphs present the salient features of the findings.

B.41 :

A naturally infected animal from the Laboratory stock at Stormont. A tuberculin test one day after the injection of 100 mg. P.P.D. tuberculin indicated complete loss of skin-sensitivity. Skin reactivity had returned to its pre-desensitization level seven weeks later.

B.48 :

A naturally infected animal bought from a dealer. Tests 3, 20, 37, 62, 77 and 98 days after desensitization by the injection of 100 mg. Weybridge standard human P.P.D. failed to reveal any evidence of skin sensitivity to tuberculin. The Stormont test also failed to reveal any reactivity. On the other hand, the intradermal injection of 0·1 mg. of heat-killed organisms (human type) 98 days after desensitization produced a marked and typical *tuberculin-type* reaction. An injection of this type shows little or no reaction in the normal animal in the first few days. This last finding is in agreement with the results of Corper (1943) who found that while tuberculin desensitization abolished the local effect to tuberculin in both dead-organism sensitized guinea-pigs and guinea-pigs vaccinated with virulent organisms, it did *not* abolish specific bacillary hypersensitivity, since reactions to bacilli were the same in tuberculin desensitized animals as they were in non-desensitized animals.

58B, 178B, 114C, 89B, 56C, 34B, 93C :

All naturally infected animals passing through Belfast Abattoir. All seven animals received an intramuscular injection of 10 mg. Weybridge standard human P.P.D. in 5 ml. liquid paraffin. When tested five to nine days later two animals (58B and 114C) failed to react either to the single intradermal or to the Stormont tests, two animals (89B and 93C) while showing a marked drop in sensitivity, remained positive to the single intradermal and to the Stormont tests, one animal (34B) gave a doubtful reaction to the single intradermal and a negative reaction to the Stormont test, one animal (178B) was negative to the single intradermal and positive to the Stormont test, and one animal (56C) was positive to the single intradermal (non-specific on a comparative interpretation) and negative to the Stormont test. Autopsy findings on these animals revealed that there was little or no correlation between the extent of the lesions, and the degree of desensitization produced.

53B, 1B, 101C :

All naturally infected animals passing through Belfast Abattoir. All three animals received an intramuscular injection of 1 mg. Weybridge standard human P.P.D. in 5 ml. liquid paraffin. A tuberculin test two days later revealed that desensitization had not been produced, though the 48- and 72-hour readings were markedly reduced. It is interesting to note that, despite the reduction in the later readings, large reactions occurred in three hours and tended to fade out quickly.

66A, 69B, 79B :

All naturally infected animals passing through Belfast Abattoir. All three animals received an intramuscular injection of 0·7 ml. (=1·05 mg. P.P.D.) Weybridge Mammalian Tuberculin. A tuber-

culin test seven days later failed to reveal any evidence of skin sensitivity (as judged by the 48- and 72-hour readings) in any of the animals. The Stormont test was also negative. All three animals showed tuberculous lesions at autopsy. This group of animals received practically the same amount of active tuberculin (1 mg.) as the previous group; the only difference was that here the tuberculo-protein was injected in buffer-saline while in the previous group the protein was in liquid paraffin.

D.2, D.4:

These animals were sensitized by the subcutaneous injection of 10 mg. of heat-killed avian bacillin in 5 ml. saline and subsequently gave marked reactions to avian tuberculin in the single intradermal and the Stormont tests, D.2 was then given an intramuscular injection of 10 mg. Weybridge standard avian P.P.D. powder in 5 ml. liquid paraffin and D.4 a similar injection of 10 mg. Weybridge standard human P.P.D. powder. Both animals were tuberculin tested eleven days later. D.2 failed to give a positive reaction as judged by the 48- and 72-hour readings and did not react to the Stormont test while D.4 gave a positive reaction (though reactivity was less than in the pre-desensitization test) to both the single intradermal and the Stormont tests.

D.7, D.8:

These animals were B.C.G. vaccinated and both gave good mammalian positive reactions to the single intradermal and to the Stormont tests. D.7 then received an intramuscular injection of 10 mg. Weybridge standard avian P.P.D. powder in 5 ml. liquid paraffin and D8 a similar injection of 10 mg. Weybridge standard human P.P.D. powder. D.7, while showing less reactivity than in the pre-desensitization test, still gave a positive reaction to both single intradermal and Stormont tests: D.8 was a doubtful positive reactor to the single intradermal and just positive to the Stormont test.

A.11:

This animal was a good mammalian positive reactor to the single intradermal and to the Stormont tests. She was sensitized some months before by the injection of 100 mg. heat-killed bovine organisms. The injection of 10 mg. Weybridge standard human P.P.D. powder reduced her skin-sensitivity very considerably, but left her still positive to both single intradermal and Stormont tests.

D.10:

This animal was dual sensitized by the injection of heat-killed avian organisms followed by the injection of heat-killed human organisms. She showed a good reaction to both avian and mammalian tuberculins in the single intradermal and the Stormont tests. Eleven days after the intramuscular injection of 10 mg. Weybridge standard human P.P.D. her reaction to mammalian tuberculin had practically vanished though her avian reaction was still marked in both the single intradermal and the Stormont tests.

DISCUSSION

The term "desensitization," which in a strict sense implies the diminution or abolition of the bodily alterations responsible for the existence of hypersensitivity, has come to imply the diminution or abolition of the capacity of the body to react to an antigen to which it has been sensitized. The mechanism of desensitization is still imperfectly understood, but in processes of this type the three most reasonable possibilities would appear to be as follows:—

1. The desensitizing procedure destroys or neutralizes the sensitizing antibody;
2. The desensitizing procedure leaves the antibody intact but creates conditions that interfere with the reactions between the antigen and antibody that is closely associated with the cells; and
3. The desensitizing procedure does not interfere with the reaction between the antigen and antibody, but so alters the tissues that their susceptibility to the product of that reaction is decreased. "There are persuasive indications that each of these mechanisms can play a role in desensitization" (Rich, 1944).

Dale's work on anaphylaxis (1920) suggests that desensitization by means of a single shocking dose of specific antigen results from a mechanism similar to that postulated in possibility (1) above, and it seems likely that this mechanism may be involved in the experiments cited in this paper. In particular, the complete desensitization produced by large doses of P.P.D. and by the Weybridge tuberculin injections, which should be more rapidly absorbed than those in liquid paraffin, seems likely to be of this type.

On the other hand, the second mechanism postulated may also play a part, in particular in animals such as B.48 in which the desensitization is of prolonged duration. The desensitizing effect of repeated injections of increasing doses of antigen has been shown to cause not a decrease in the amount of antibody, but, on the contrary, an actual increase (Kallos & Kallos-Deffner, 1935). The assumed mechanism here is that of reaction of antigen with circulating antibody preventing reaction with tissue antibody. Rich (1944) concludes that in the case of tuberculin desensitization this mechanism may operate. In the case of B.48 it might be assumed that the initial desensitizing effect was produced by the first mechanism while the prolonged effect was due to the slow absorption of antigen from the oil injection site resulting in increased antibody production. It is, of course, true that Weybridge standard human P.P.D. is, in the ordinary way, practically non-antigenic, but the skin activity of a tuberculin is, nevertheless, paralleled by its antigenicity, small though that antigenicity may be (McCarter & Watson, 1942), and it does not seem beyond the realms of possibility that this P.P.D. may, under certain circumstances, produce an antibody response.

The third possible mechanism of desensitization is encountered chiefly in non-specific desensitization, and particularly in desensitization effected by drugs, and there is little evidence, at present, that it plays any part in the tuberculin type of desensitization.

The preliminary cross desensitization experiments (see D.2, D.4, D.7, D.8, A.11 and D.10) appear to show that the possibility of reducing non-specific reactivity in dual sensitized animals does exist, but whether or not this technique will prove of practical value must await the results of further experimental work—particularly in relation to the desensitizing dosage, the route of injection, and the time interval between desensitization and testing.

The finding that the tuberculin desensitized animal B.48 reacts to the intradermal injection of heat-killed human bacilli is of considerable interest. As already pointed out this result is in conformity with the guinea-pig findings of Corper (1943) who also found (Corper & Cohn, 1944) that viable and heat-killed bacilli were incapable of desensitizing infected guinea-pigs.

(To be continued)

WORLD MEDICAL ASSOCIATION

On the initiative of the British Medical Association an International Medical Conference has been held in London under the chairmanship of Sir Hugh Lett, President of the Association. The conference was attended by representatives and observers from 31 countries. The conference decided to establish a World Medical Association (W.M.A.), composed of representatives of the national medical associations in the different countries. The first meeting of the W.M.A. will be held in Paris next year. The objects of the Association are defined as follows:—

(1) To promote closer ties among the national medical organizations and among the doctors of the world by personal contact and all other means available in order to assist all peoples of the world to attain the highest possible level of health.

(2) To study the professional problems which confront the medical profession in their different countries.

(3) To organize an exchange of information on matters of interest to the medical profession.

(4) To establish relations with, and to present the views of the medical profession to the World Health Organization and U.N.E.S.C.O.

The joint secretaries of the new body are Dr. P. Cibrie (Paris), secretary of La Confédération des Syndicats Médiceaux Français, and Dr. Charles Hill (London), secretary of the British Medical Association.

Commenting on the decision to establish a World Medical Association, *The Lancet* observes: "If the World Medical Association is to fulfil the aims that are set before it, it will need world support. Its first purpose must therefore be to attract into full membership those countries which were not represented at the meeting or which, like the United States of America, were represented only by observers. Its second purpose may well be to become a live body, sharing actively in world health organization. Last week the sentiment seemed to be against the association's concerning itself with scientific medicine, because, according to one delegate, each country has its own academies competent for this work. On the other hand, the resolution setting out the association's functions allowed for the exchange of information between the different countries. It might be best if this clause were liberally interpreted; for, as we have lately suggested (September 7th, p. 352), the complexity of modern medicine calls for the closest technical understanding between all countries. The association, if it shouldered the task of promoting the exchange of scientific information, and particularly information on research, might benefit not only world medicine but the professions in the constituent countries."

CLINICAL COMMUNICATION

An Outbreak of Parasitic Bronchitis in Calves Associated with an Infection of the Lungs with an Organism resembling Bacillus actinoides

O. V. GUNNING, D.V.M., F.R.C.V.S.
Acle, Norwich

Blakemore[1] recently recorded two outbreaks of bovine broncho-pneumonia, both in cattle six to 12 months old, which were suspected of suffering from parasitic bronchitis and from which he isolated a pleomorphic organism from the lungs resembling *Bacillus actinoides* originally described by Theobald Smith (1918-21). He further states that although the organism could be readily demonstrated in smears of the bronchial exudate its isolation proved difficult.

The same author reports that the disease was produced experimentally in calves without difficulty by the inter-nasal injection of early cultures, but that, after further subcultivation, the organism lost its pathogenicity.

The animals concerned in this report were a bunch of tuberculin-tested Friesian and Ayrshire heifers ranging from five to ten months of age.

The first of the calves showed symptoms of husk on September 8th, 1945. It was treated intratracheally and put on M. & B. 693. On September 10th the remaining 56 calves were treated intratracheally. At this time a further calf showed extreme pneumonic symptoms; this calf and two others died a few days later. All the remaining calves were then housed and dosed with phenothiazine, 14 of the worst being put in a yard by themselves. They received good food with an allowance of cake and appeared to be overcoming the cough and beginning to thrive. At this stage, however, certain calves suddenly started to develop an acute pneumonia with a temperature of 105° F. and over. It was noticed that the victims were not the small calves, but some of the best and strongest. Eleven out of the 14 deaths were amongst the strongest calves. *Post-mortem* examination revealed, in most cases but not all, a heavy parasitic infestation in the trachea and bronchioles and the lungs showed extensive hepatization.

It was at this point that advice was sought from the Institute of Animal Pathology at Cambridge, the Department kindly examining blood samples taken before death and material from the dead calves. The blood samples were normal for calcium and magnesium content and did not reveal any bacterial infection. A portion of the lung substance showed broncho-pneumonia; there was no evidence of parasitic bronchitis but an organism resembling *B. actinoides* was recovered in pure culture.

Treatment.—As already stated, the calves were put on M. & B. 693 early in the attack. On taking the matter up with Messrs. May & Baker, they considered our dosage was on the low side and from this time onwards each calf received a "loading" dose of 6 g. (12 × 0·50 g. tablets) per cwt. body weight followed by eight-hourly doses of 3 g. (6 × 0·50 g. tablets) per cwt.: the supporting doses were continued until the end of the fourth day. Even with the increased dosage the results were disappointing. Messrs. May & Baker then suggested that it might be of value to try out one of the new active soluble sulphonamides by parenteral administration and they very kindly forwarded us a supply of soluthiazole. The calves weighing approximately 2 cwt. were therefore given 100 c.c. of soluthiazole intravenously (equivalent to 20 g. of the drug) and the concentration was thereafter maintained by 6 g. oral doses of M. & B. 693, the first given four hours after the intravenous injection of soluthiazole. The calves selected for this treatment were all advanced cases and the results were spectacular, one calf *in extremis* making a complete recovery. It was found, however, that the oral dosing had to be continued for a long time. On two occasions as soon as the treatment was stopped the lung symptoms reappeared. There were no more deaths after the intravenous treatment was adopted and although the calves still showed symptoms of cough in the following spring they are now in perfect condition.

Discussion

The mortality, in agreement with that reported by Blakemore, was exactly 25 per cent. It has been found on a number of previous occasions that for some unexplained reason certain outbreaks of parasitic pneumonia have an unusually heavy mortality. This has also been noticed in some outbreaks affecting older cattle which, according to accepted standards, should have acquired a degree of active immunity. On the other hand, a larger majority of outbreaks give little anxiety.

It is of interest to note that, about a month earlier, an outbreak of the condition, in no way connected with the cases now described, occurred in a bunch of calves on the same farm. These cases, although acute and not without fatalities, responded quickly to orthodox treatment.

No less an authority than Mönnig,[2] discussing treatment of this disease, states: "If animals are sheltered against adverse weather conditions and well fed they soon lose their parasites which do not live long in the host. This may account for many apparent successes in attempted treatment and is itself the best treatment that can be recommended." In spite of this statement cases of heavy mortality occur where calves have every care and attention. This does suggest that other factors may be concerned in addition to the actual parasite.

It is surprising that in the various discussions which take place from time to time on this affection, little if any mention is made of the secondary invader.

Bugg (1943)[3] records a case of pasteurellosis associated with husk in a dairy herd which appears to have been of unusual severity. Blakemore also states that Pasteurella of low virulence and pyogenic cocci are often found in cases of broncho-pneumonia, developing after exposure or transit in cold weather, and states that Mitchell (1939) described *C. pyogenes* infection in adult cattle associated with a heavy infestation with *Dictyocaulus viviparus*. The same author also asserts that while very little is known regarding the primary bacterial causes of broncho-pneumonia in the bovine, infection with the organisms commonly associated with the condition is usually believed to take place following damage by other agents such as parasites or as a result of some reduction in the general resistance of the animal.

May it not be that heavy infestations of parasites, by their inflammatory action, merely open up a channel for the entrance of other organisms and that, in attacking the problem, too much attention is concentrated on the parasite and too little on the secondary invader?

The writer desires to express his indebtedness to the Institute of Animal Pathology, Cambridge, to Mr. F. Blakemore and to Messrs. May & Baker.

References

(1) Blakemore, F. (1945.) "Infection of the Bovine Lungs with an Organism Resembling *Bacillus actinoides*. *J. comp. Path.* **55**. No. 2.
(2) Mönnig, H. O. Veterinary Helminthology and Entomology.
(3) Bugg, R. R. (1943.) (1943.) "Pasteurellosis Associated with an Outbreak of Husk in a Dairy Herd." *Vet. Rec.* **55**. 220.

BRITISH MEDICAL STUDENTS' JOURNAL

"For the first time," says the editor of the first issue of this journal, "British medical students from all over the country are to produce a journal." The first plan for this journal was drawn up by A. Malone of the London Hospital and D. Whittingham of Durham, and the editorial board of three men and one woman propose to publish in the future technical articles and news, "complemented wherever possible by art and literature of a high standard." "Resisting attempts to impose upon them a partisan approach to many problems, the editorial board have," comments *Nature*, "wisely decided to be guided only by the wishes of the majority. They will fight for international co-operation and have, for this reason, devoted the whole of this first issue to an account of the new International Students' Federation and of the re-birth of the Czech universities; for it was in Prague at the World Students' Congress in November, 1945, that an important part of the work on the foundations of this new organization was done. The first ordinary issue of the *British Medical Students' Journal* (published from B.M.A. House, Tavistock Square, London, W.C.1) is appearing in October, and thereafter one issue will be published each term, each containing essays, articles and news interesting to medical students. An indication of the kind of fare to be provided is given by the announcement in this issue that the October number will contain articles by Sir Joseph Barcroft on foetal respiration, by Professor Samson Wright on hypertension, by Dr. James Marshall on penicillin and venereal disease, and by Dr. Charles Hill, secretary of the British Medical Association, on the National Health Service, together with news, short stories and articles contributed from all over Britain. An interesting feature will be a section devoted to nurses who wish to improve the efficiency and conditions of their service. It is particularly gratifying to know that medical students, like so many other sections of the community, wish to help the nurses to attain the status, remuneration and conditions of life and work which are merited by the important part they play in modern medical practice."

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Weekly Wisdom

There is a new product, the conviction that obliteration of our cities can send us reeling back into the primal darkness when relationship within the clan or tribe was the largest common denominator among men.—General Eisenhower, acknowledging the freedom of the City of Edinburgh.

ABSTRACT

[Differential Bactericidal Activity of Bovine Serum toward Strains of *Br. abortus* of High and Low Virulence. Irwin, M.R., & Beach, B.A. (1946). *J. Agric. Res.* **72**. 83.]

The authors have produced evidence to show that even in the complete absence of agglutinins, the serum of an animal vaccinated with *Br. abortus* strain 19 may exert antibacterial activity against the organism greater than that of normal animals. For the purpose of the observation, 15 cows which had been injected with 5 cc. of strain 19 suspension were examined at intervals for six to 18 months after vaccination, when the agglutination titres had fallen to 1/100 or less. The tests were carried out by making progressive dilutions of serum from the vaccinated animal, adding complement obtained from bovine blood, and determining the end point at which the mixture was bactericidal to a known concentration of brucella organisms. Two strains were used for the purpose—strain 19 and a virulent strain.

It was found that the serum of a normal, unaffected animal rarely exhibits bactericidal activity towards strain 19 or a virulent strain beyond a dilution of 1 : 160, whereas the sera of vaccinated animals showed activity at a dilution of 1 : 2560 or even higher.

There did not appear to be any significant difference in the activity of sera showing varying agglutination titres. In general also, it was found that though the difference in bactericidal activity towards the two strains was slight, it was practically always in the direction of greater activity towards strain 19.

S. J. E.

REVIEW

["Man Midwife." By Ernest Gray. Robert Hale, Ltd. Price 12s. 6d.]

We reviewed the predecessor of this volume a few years back, on the grounds that it was the work of a member of the veterinary profession.

There are additional grounds for noticing the present work of Mr. Gray, in that it introduces the great John Hunter, and describes the foundation of the Royal Veterinary College at Camden Town. Among the illustrations will be found a facsimile of the original notice concerning the formation of the College in 1791, as well as a portrait of the first president of the Board of Agriculture.

The substance of "Man Midwife" is in diary form, and continues the autobiography of John Knyveton from the time of his retirement from the sea, and covers his later life as an obstetrician.

So far as we can judge, the author has not unduly stretched historical truth to fictional ends, and we found the book interesting, and one that might well find its way on to the waiting-room bookshelf.

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Also received: "My Animal Babies," by Belle J. Blenchley. Well illustrated. Faber and Faber, 24, Russell Square, W.C.1. Price 12s. 6d.

SOUTHAMPTON MEDICAL EXHIBITION

A most successful exhibition—believed to be the first of its kind held in England since 1939—was held at the Polygon Hotel, Southampton, on September 24th, 25th and 26th, and was well attended by doctors, veterinary surgeons and chemists from a wide area.

The exhibitors were: Abbott Laboratories (England), Ltd.; Armour Laboratories; Bayer Products, Ltd.; Boot's Pure Drug Co., Ltd.; Burroughs Wellcome & Co.; Duncan, Flockhart & Co.; Glaxo Laboratories, Ltd.; C. J. Hewlett & Son, Ltd.; Imperial Chemical (Pharmaceuticals), Ltd.; Eli Lilly & Co., Ltd.; J. M. Loveridge, Ltd.; H. R. Napp, Ltd.; Post-Graduate Medical Journal and Vitamins, Ltd.

In a speech of welcome to the exhibitors and their representatives the Mayor of Southampton, R. J. Stranger, Esq., M.C., who was accompanied by the Medical Officer of Health, Dr. H. C. Maurice Williams, O.B.E., expressed his appreciation of the enterprise shown by the organizers.

In addition to the main exhibition room there was a projection room showing three films daily: Intravenous Pentothal Anaesthesia; Animated Haematology; Sub-Total Thyroidectomy.

The exhibition was open daily from 11 a.m. to 6 p.m., and was organized and sponsored by J. M. Loveridge, Ltd.

NOTES AND NEWS

Diary of Events

Oct. 16th.—Annual meeting of the Scottish Branch, N.V.M.A., at Perth (Station Hotel), 2.30 p.m.

Oct. 16th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, 1, Wimpole Street, W.1, 5 p.m.

Oct. 16th.—Meeting of the Agriculture Group of the Society of Chemical Industry, in the Physical Chemistry Lecture Theatre, Royal College of Science, South Kensington. "An Experiment in Farming the Sea," Dr. F. Gross, Department of Zoology, University of Edinburgh.

Oct. 16th.—Meeting of the Western Counties Division, N.V.M.A., at Taunton (Deller's Café).

Oct. 17th.—Meeting of the South-Eastern Division, N.V.M.A., at Maidstone (Royal Star Hotel), 2.30 p.m.

Oct. 18th.—Meeting of the Eastern Counties Division, N.V.M.A., at Bury St. Edmunds (Angel Hotel), 2.30 p.m.

Oct. 19th.—Scientific Meeting of the Nutrition Society (Scottish Group), in the Strathcona Club, The Rowett Research Institute, Bucksburn, Aberdeen, 2.30 p.m.

Oct. 23rd.—Meeting of the Ayrshire Division, N.V.M.A., at the Hannah Institute, Ayr, 2.45 p.m.

Oct. 24th.—Annual Meeting of the Society of Veterinary Practitioners, at the Holborn Restaurant, London, 2 p.m.

Oct. 30th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at the Royal "Dick" Veterinary College, 2.30 p.m.

Nov. 2nd.—Joint Discussion Meeting of the Biochemical Society and the Society for General Microbiology, in the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, 11.15 a.m.

Nov. 9th.—Annual Meeting of the Society of Women Veterinary Surgeons, at the Holborn Restaurant, High Holborn, W.C.2, 11.15 a.m. As indicated in our Notices Column, luncheon in the Restaurant will be followed by an X-ray talk and demonstration by Mr. Gordon C. Knight, at the Royal Veterinary College.

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New Appointments to the Staff of the Ministry of Agriculture

As notified in recent issues, Council, N.V.M.A., has decided that no advertisements for appointments to the veterinary staff of the Animal Health Division of the Ministry of Agriculture shall be accepted for *The Veterinary Record* pending the settlement, in a manner satisfactory to the Association, of the question of the status and salaries of the Veterinary Officers of the Division.

In the meantime, any members of the profession who may, nevertheless, contemplate applying for such posts, should these be advertised elsewhere, are requested first to communicate with the General Secretary of the Association at 36, Gordon Square, London, W.C.1.

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Minister's Refusal to Attend N.V.M.A. Annual Dinner

A "Lost Chance"

The agricultural and general Press, without exception, were adversely critical of the action of Mr. Tom Williams in cancelling his acceptance of the invitation extended to him to attend the Association's annual dinner and in instructing his principal officers to do likewise. We append some typical comments.

"Mr. Churchill somewhere stresses the importance of politicians keeping open channels of communication with men from whom they are separated but with whom they may find it convenient, or indeed necessary, to resume collaboration," says the *Sunday Times*, and proceeds: "We commend this wise counsel to Mr. Tom Williams, the Minister of Agriculture. Having had a stiff dispute with the National Veterinary Medical Association, he cancelled his acceptance of an invitation to the Association's annual dinner. It seems rather foolish. The Minister of Agriculture cannot disinterest himself in the veterinary surgeons, and when they differ it is not less but more reason why they should keep up social relations."

In its issue of last week the *Farmer and Stock-Breeder* observed, through its well-known contributor "Blythe": "It is a great pity that Mr. Williams decided not to attend the National Veterinary Medical Association dinner on Thursday. Whatever the merits or demerits of the dispute which has arisen between the Ministry and the Association about salaries of veterinary officers, this was an occasion for one of those personal gestures which the Minister knows so well how to make.

"There are many who think he has merely hardened the determination of the veterinarians to stand up for what they conceive to be their rights. I do not know what the next step will be, but in view of the cry about a shortage of veterinary surgeons it cannot be an easy one for the Ministry.

"Lost Chance"

"Mr. Williams would have been welcomed no matter what hard things he may have cared to say. His personal prestige would have been enhanced and he would have given a lead which must have helped towards the resumption of negotiations on a friendly basis.

"As things are, matters are left completely in the air. Firmness is an essential in a Minister of the Crown, but it is not the only quality in the make-up of a statesman. Moreover, it is usually by advancing, not retreating, that victories are won."

"Without taking sides in the dispute between the veterinary surgeons and the Ministry, I cannot help thinking that it would have been a very much bigger gesture if Mr. Williams had gone to the dinner of the N.V.M.A. instead of staying away," writes the Editor of the *Farmers' Weekly*. The Minister's presence—which need not in the least have conceded anything in the dispute—would have created a feeling of broad-minded tolerance which might well have gone a long way to composing the difference between the parties." Finally, in this week's issue of *The Sunday Times*, Mr. C. P. Cakebread of King's Norton, expresses particular interest in the Minister's action in instructing his senior staff to cancel the invitations given to them. "Is there," he asks, "any precedent in a democratic country for this interference with the rights of senior civil servants to determine where they shall dine?" . . .

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PERSONAL

Retirement of Lt.-Col. J. A. Dixon, T.D., M.R.C.V.S.

It will be agreed by all that the Veterinary Public Health Service has lost one of its pioneers with the retirement on September 30th last of Lt.-Col. J. A. Dixon, T.D., M.R.C.V.S., from his appointment as Chief Veterinary Officer to the Public Health Department of the Leeds City Council, an appointment which he has held for over 41 years.

Colonel Dixon qualified as a member of the Royal College of Veterinary Surgeons in 1900, and for some years engaged in general practice, being particularly interested in horses, an interest which he has always retained. In 1905, he was appointed Veterinary Inspector to the Leeds Corporation and very soon became recognized as an expert in public health veterinary matters; his advice was sought by many of his colleagues and by local authorities throughout the country, particularly on the inspection of meat and other foods, a subject in which he was intensely interested, and in which he trained many pupils both in this country and from abroad.

Colonel Dixon was a member of the T.A. and during the first World War served with the Royal Army Veterinary Corps, leaving the Service with the rank of Major. Later he was gazetted Brevet Lt.-Colonel and was granted the Territorial Decoration.

In 1907, he was elected a member of the Royal Sanitary Institute and has always taken a very keen interest in that organization. He was elected a Fellow in 1923 and has acted as an examiner for the Meat Inspectors' Examination continuously since 1910. He has been a member of the Council of the Institute for ten years and is a member of many of its committees, including the Examination Committee, of which he is Chairman. He has also acted as Recording Secretary of the Veterinary Hygiene Section of the Institute since 1930.

During the last World War, Colonel Dixon's two sons served with the Forces, one as an officer in the Royal Army Veterinary Corps, whilst the "Colonel," as he is affectionately known to many of his closer friends, acted as Food Decontamination Officer for Leeds City, and was responsible for the training of the A.R.P. Food Treatment Squad.

During his 41 years' service with the Leeds Corporation, the Veterinary Department has increased its scope very considerably, and at the time of his retirement, apart from his veterinary duties, he was responsible for the administration of a large variety of enactments.

Colonel Dixon's many other activities are well known to the profession and his colleagues will wish him many happy years of well-earned retirement.

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Professor Henry Dryerre's Retirement

In our issue of August 3rd we recorded that Professor D. C. Matheson (Professor of Pathology and Acting Principal) and Professor H. Dryerre (Professor of Physiology) were due to retire from the staff of the Royal (Dick) Veterinary College at the end of the session, and the very pleasant function held in the College on Monday, July 15th, when presentations were made to both.

The following tribute to the work of Professor Dryerre appeared in the issue of *The Scotsman* of September 30th:—

"To-day the Royal (Dick) Veterinary College loses, by superannuation, the services of Professor Henry Dryerre, M.D., D.Sc., F.R.S.E., who has occupied its Chair of Physiology since 1935. Since he joined the staff of the late Sir Edward Sharpey Schafer as a lecturer in Biophysics 30 years ago, Professor Dryerre has been an indefatigable research worker in medical and veterinary fields, and a teacher remembered with affection by some thousands of men and women who have been his students.

"Professor Dryerre set the standard in Britain for the teaching of physiology on the veterinary curriculum, and the course he built up at the Royal (Dick) Veterinary College is even to-day equalled by very few veterinary schools.

"A number of original papers, on subjects ranging from the influence of the thyroid gland on cardiac function to methods of increasing the fertility of silver foxes, display the breadth of his attainments, and his contributions to the elucidation of the aetiology and treatment of milk fever in cows were of the highest value. He was able, by the application of physiological principles, to suggest a line of investigation of this disease which proved successful, and the resulting treatment of the disease by calcium therapy is used to-day throughout the civilized world."

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Births.—Lewis.—On September 26th, 1946, at Threemilestone, Truro, Cornwall, to Margaret, wife of G. O. Lewis, M.R.C.V.S.—a daughter, Gwenda Margaret.

Ridge.—To Mary, wife of J. E. M. Ridge, M.R.C.V.S., of Harlow, Essex—a son.

Marriage.—Holford—Crawford.—On September 24th, 1946, at Cults West Church, Geoffrey, Captain R.A.V.C., youngest son of Mr. and Mrs. Ernest Holford, of Rivelyn, Datchett, Bucks., to Lorna Robertson, only daughter of Mr. and Mrs. Edmund Crawford, of Cults, Aberdeenshire.

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R.C.V.S. OBITUARY

The Late Capt. James Jones, M.R.C.V.S.

A Further Tribute

Professor J. G. Wright, of the University of Liverpool Veterinary School, writes:—

"It is with deep regret that we of the Liverpool School learn of the death of Captain James Jones at the early age of 26.

"He was educated at the Alsop High School, Liverpool, and entered the University in 1937. He qualified M.R.C.V.S. in July, 1942, after a most creditable student career. In August of the same year he gained the unique distinction of taking his B.V.Sc. degree with Honours.

"Captain Jones was not only a man of great ability but one of great charm and modesty, who endeared himself to all with whom he came in contact. By his untimely passing the profession has lost one for whom we had confidently anticipated a valuable life's work."

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VETERINARY EDUCATIONAL TRUST

Dr. W. R. Wooldridge, Scientific Director of the Trust, recently visited Bedford to discuss with the veterinary surgeons of that county ways in which to advance its aims and objects. The practitioners expressed their sympathy and promised to help in every way. They suggested the establishment of local sub-committees in each of the major centres of Bedfordshire.

The Trust is starting a fund for research in spinal anaesthesia of animals.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Lincs. (*Kesteven*).—St. Margaret's Farm, Thorpe-on-Hill, Lincoln (Sept. 30th).

Northants.—12, Jubilee Road, Byfield, Rugby, Warwicks (Sept. 30th); Crowne Inn, Staverton, Daventry, Northants (Oct. 4th).

Notts.—Moor Road, Papplewick, Nottingham (Oct. 2nd).

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BERKELEY'S LOSS OF HOUNDS OVER AUST CLIFF

The Berkeley Hunt sustained a severe loss on Monday last, when ten valuable hounds dashed over the 100 ft. cliff at Aust, Gloucestershire, near the site of the new Severn Bridge, and were killed on the rocks below. The hounds had put up an old fox, which circled back to his hole among the thick undergrowth just below the cliff edge and disappeared. In full cry the pack went after him, and after crossing several fields ten hounds went headlong over the cliff, in spite of the efforts of the huntsmen to turn them. The master of the hunt said that their loss would have

a serious effect on the season's hunting. The hunt was called off and the pack taken back to kennels.

There have been previous mishaps of a similar nature on the Aust cliff, the last occasion being in the 1929-30 season, when two hounds were killed.

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THE ASSOCIATION OF AGRICULTURE

Mansion House Dinner

On Monday last the President and Council of the Association of Agriculture were the guests of the Lord Mayor at dinner at the Mansion House.

Proposing the toast of "The Association of Agriculture," the Minister of Agriculture, Mr. Tom Williams, M.P., said the voice of many "Dismal Jimmies" was heard advising the farmer to cut expenditure to a minimum and disregard the advice of the men who were serving on the agricultural committees, distrust the Government, "which only existed to make him work," and generally to look after his own skin. That he regarded as the voice of pure pessimism. We had a system of assured markets and established prices. The county committees were an experiment which had been proved up to the hilt, and he believed that they held out a greater hope for the industry than anything which had been done in the last half century.

Replying to the toast, Lord De La Warr, President of the Association, said that the towns had tried for the last few generations to live to themselves, quite ruthlessly demanding an ever-increasing standard of life based on low returns to food producers in this and other countries. That scheme of things had broken down. Even when food was once again plentiful, it would surely be better for industry if we spent our limited supplies of foreign exchange on raw materials for our factories rather than food that might be produced at home. Nor would it pay the towns any better in the future than it did in the past to buy their food so cheaply that the purchasing power of food producers was again destroyed, for food producers, by weight of numbers, remained one of their biggest markets.

The toast of "The Guests" was proposed by Mr. Walter Elliot, a former Minister of Agriculture, Mr. Anthony de Rothschild responding, and that of "Town and Country" by Mr. Charles Dukes, Chairman of the Trades Union Congress, Mr. James Turner, President of the National Farmers' Union, making reply.

The company was fully representative of industry and all branches of agriculture, and among those who intimated their intention of being present were:—

The Bishop of London, Lord Rosebery, the Duke of Norfolk, Lord Radnor, Lord Camrose, Cardinal Griffin, Lord Bledisloe, Lord Courthope, Lord Bennett, Mr. H. W. Dawes (President, R.C.V.S.), Mr. Geo. N. Gould (Past President, N.V.M.A.), Dr. W. R. Wooldridge, Mr. J. Westwood, M.P., Lord Moran, Lord Chorley, Mr. R. S. Hudson, M.P., Mr. Anthony de Rothschild, Sir Arthur Street, Sir Donald Vandepeer, Sir Alfred Webb-Johnson, Rear-Admiral Sir C. Varyl Robinson, Colonel Walter Elliot, Mr. Charles Dukes, and Mr. J. Turner.

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PROPOSED NATIONAL DAIRY TECHNOLOGICAL INSTITUTE

The Society of Dairy Technology, which has an active branch in Scotland, has issued a plea for the creation of a National Dairy Technological Institute, which, it is suggested, should be linked with the University of Reading and should be in close proximity to the National Institute for Research in Dairying. This University has maintained a Dairy Department for 50 years and provides both degree and diploma courses in dairying.

"The printed plea in favour of this enterprise," states the *Farming News*, "emphasizes that a regular flow of well-trained entrants into the milk industry is now a vital and urgent necessity. Dairy technology is still confined in the main to dairy husbandry, milk production, manufacture of milk products under farmhouse conditions. It is suggested that this position is partly due to a lack of modern equipment at the training centres though they confess that the position in this respect is rather better in Scotland than it is over the Border. The proposed new Technological Trust would provide for advanced dairy training in milk processing and manufacture, the dairy training of engineers (which is at present non-existent), short refresher courses of executive, scientific and operative staffs, research on large-scale processing and independent testing of dairy machinery. It is argued that the initiative must come from the industry itself before financial assistance can be provided from public funds."

ELECTRICITY FOR FARMS

£72,000,000 Improvement Scheme

Agreement has been reached between electrical supply companies and the National Farmers' Union of England and Wales and the Scottish National Farmers' Union and Chamber of Agriculture on a five-year plan to spend £72,000,000 to take electricity to 150,000 holdings in Great Britain.

A statement issued by the National Farmers' Union announced that details of the proposals wouud be put before the Government departments directly concerned, who would be asked to afford first priority to all supplies required. State financial aid would not be sought. It is estimated that a capital expenditure of £45,000,000 will be required to connect up 15,000 farms in the first year, followed by 37,500, 52,500, 30,000 and 15,000 farms in the succeeding years. The rest of the money will be found by the agricultural industry to cover wiring, fitments and apparatus in farm buildings.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

Notice to Correspondents

The Editorial Committee regrets that, the paper supply situation having deteriorated, it has become necessary to ask correspondents again to accept a limitation on the length of letters submitted for publication. Accordingly, contributors to our Correspondence Columns are requested to note that, until further intimation is made, their communications must not exceed 350 words.

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PROPAMIDINE (M. & B.) IN THE TREATMENT OF SUMMER MASTITIS

Sir,—Although I am unable to give case reports or furnish bacteriological records, I have had considerable success with the intramammary infusion of propamidine (M. & B.): (0·15 per cent. propamidine-di-isethionate)—as recommended for intra-uterine injection—in the treatment of summer mastitis. In acute cases, where temperature has been high and there has been considerable constitutional disturbance, but the mammary secretion has not been straw coloured or bloodstained, the injection of 2 to 6 oz. has proved of extraordinary benefit.

The procedure has been to strip the quarter, inject until pressure becomes high, leave for three hours and then strip every two hours. The injections are repeated in 12, 24 and 36 hours with similar frequent stripping.

In practically every case the temperature has fallen within 24 hours and the animal has improved in general condition. In some cases milk has later been produced from the quarter.

Whilst not venturing to hope that this is the be all and end all in the treatment of this serious and often fatal condition, I would recommend it for trial. In a few cases of streptococcal mastitis the injection has appeared to produce improvement and no local reaction has occurred.

Yours faithfully,

Camden House, London Road, T. J. Margarson.
Stroud, Glos.

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A "POLITICAL" ADVERTISEMENT

Sir,—Many other members besides myself will possibly have been rather shocked at reading an advertisement in the current number of the *Record*. Already we have far too much of party politics in our daily life, and they are to be found in places where they have no business to be. They have forced their way into municipal elections, where they are now firmly established, and they have insinuated themselves into commerce, producing that political-commercial anomaly called the Co-operative Society. This attempt to bring party politics into our profession is greatly to be deplored, and I for one hope that nothing will come of it. The professions are not the place for politics, whether of the left or of the right, and at all costs we should resist all attempts to introduce politics into the veterinary profession. It would be a good thing if the *Record* would refuse to accept any further advertisements of this kind.

Yours faithfully,

Whitley Ridge, A. A. Abbott.
Brockenhurst, Hants.
September 25th, 1946.